

## **Title: Deciphering Word Problems In Order To Write Equations**

### **Brief Overview:**

This unit includes three lessons that enable students to effectively unlock word problems. The unit begins with simple translation of equations. Then, the students will work in groups to explore the uses of various organizers that will help them to solve word problems. The last step of our unit includes incorporating the computer lab and using word processing to ease problem solving.

### **NCTM Content Standard/National Science Education Standard:**

Algebra-Instructional programs from prekindergarten through grade 12 should enable all students to:

1. Represent and analyze mathematical situations and structures using algebraic symbols.
2. Use mathematical models to represent and understand quantitative relationships.

### **Grade/Level:**

7<sup>th</sup>/8<sup>th</sup> grade

### **Duration/Length:**

4 days (50 minutes each)

### **Student Outcomes:**

Students will:

- Translate simple sentences into equations.
- Identify what type of organizer is appropriate in order to display the information in a problem.
- Place the information into the organizer while eliminating phrases in the word problems.
- Solve the problem by writing an equation from the remaining statement.

### **Materials and Resources:**

- 25 computers (lab)
- Teacher computer
- 25 copies of worksheets

## Development/Procedures:

### Lesson 1

Preassessment – Students are able to solve equations and translate expressions prior to this lesson. The following 3 drill problems will be on the overhead/chalkboard when the students arrive.

$$3 - y = 7, \frac{n}{4} = 8, 3r - 5 = 20$$

Launch – The teacher will have a basket of apples and will pose the following question for the students: “George had a basket containing an even number of apples. He gives half to his brother and three to his mom. How many apples did he have left? The students will have a bag full of die cut apples to help them work out the problem. Each group will have a different number of apples so there will be many answers. See Teacher Worksheet #1.

Teacher Facilitation – The teacher will then tell the students that George ended with four apples. Ask the following: “Given this information, can you determine exactly how many apples George began with? Can you set up an equation to represent this situation?” The teacher will also show the students at this time how to highlight important information in a word problem.

Student Application – Independently, the students will complete a worksheet of translating 10 sentences into algebraic equations. See Student Worksheet #1.

Embedded Assessment – The teacher will circulate while the students are completing their worksheet and will stamp those answers that are correct. Once each student has five stamps, he/she will be asked to become a stamper and check other students’ work.

Reteaching/Extension – For those who have not completely understood the lesson, the teacher will sit with them and assist them as the students are checking each other. The teacher will also ask the students to complete the worksheet for homework. The teacher will suggest that the students continue to use the highlighter to pick out important vocabulary. For those who have understood the lesson, the teacher will ask them to make up their own word problems and ask a neighbor to solve the problem.

### Lesson 2

Preassessment and Launch-The teacher will put charts, tables, graphs, etc., from the newspaper and magazines on the students’ desks. The students will be asked to examine the charts, graphs, etc., and answer the following questions in

complete sentences. "What type of information does the chart, etc., provide? Is this a good way to show this data? Why?"

Teacher Facilitation-Placemat Activity- Each table will be covered with a piece of bulletin board paper that has a problem glued to the middle. Teacher Resource Worksheet #2 Allow each student time to work on solving the problem. Tell them that they can draw a picture, make a table, etc., on the bulletin board paper to solve the problem. After students have had about 5 minutes, ask them to share with a partner how they solved the problem. Lead a class discussion that involves hearing the various ways to solve this problem.

Student Application-Students will complete five problems on Student Worksheet #2 (see attached). Each problem will have a table or diagram provided in order for the student to set up or organize the problems. At this time, the students are not being asked to solve the problem just to set it up.

Embedded Assessment-The assessment will include each table of students completing one problem from the worksheet on the chalkboard.

Reteaching/Extension

- For those who have not completely understood the lesson, the teacher will check in with them and work one-on-one with them. The teacher will also pair struggling students with those who understand.
- For those who have understood the lesson, they can solve the problems from the worksheet and help other students.

Lesson 3 (2 days to complete-both days in computer lab)

Preassessment-Drill with the following questions.

Rate yourself!

1. How comfortable are you with typing?

<i>Scared</i>		<i>OK</i>		<i>Very Comfortable</i>
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>

2. Do you know how to highlight when typing?

Launch - These lessons will take place in the computer lab. The students will be asked to type the following information filling in the blanks on their computer when they enter the lab.

*My name is \_\_\_\_\_.*

*I was born on \_\_\_\_\_, \_\_\_\_\_.*

*I live in \_\_\_\_\_ County/City.*

*My favorite color is \_\_\_\_\_.*

*The best thing about school is \_\_\_\_\_.*

Once each student has typed this information on their screen, the teacher will ask them to complete the following directions.

1. Highlight in yellow your birthday.
2. Highlight in blue your name.
3. Highlight your favorite color in that color.

The teacher will model how to highlight on the teacher computer that will be projected for all students to see.

**Teacher Facilitation-**The teacher will demonstrate how to organize problems on the teacher screen. The teacher will type in two example problems on the teacher computer and screen. Use Word Processing Document #1. The teacher will elicit from the students which information should be used first, second, etc., in order to set up the table. The teacher will show the students how to use the black highlighting function on the computer to blackout the information that they have used. The teacher will ask the students to highlight in yellow the information that is left that they will use to create an equation.

**Student Application -** The students will complete the other three problems on this document independently. The teacher will allow the students about 10-15 minutes to complete these problems. The teacher will circulate to help those who are having problems. The teacher will have the answers already complete for the last three problems. She will ask the students to check their work with hers and ask any questions about the problems or the process used to organize the problems.

**Embedded Assessment-** The teacher will pair strong students with students that may be struggling in order to complete the assessment. Each pair of students will be assigned to organize and solve one of the problems on Student Worksheet/Word Processing Document #2. The students will use the time left in the class to complete this. The students will also be given about 15 minutes on day 4 to complete their problem. Each pair of students will then present (teach) their problem to the class on day 4 using the teacher computer and projector.

**Reteaching/Extension-**

- For those who have not completely understood the lesson, the teacher will circulate and help them while other students are teaching.

- For those who have understood the lesson, the teacher will ask them to complete the other nine problems on the worksheet. All students should do this for homework at the end of day three. Also at the end of day four, all students should study for the assessment on day five.

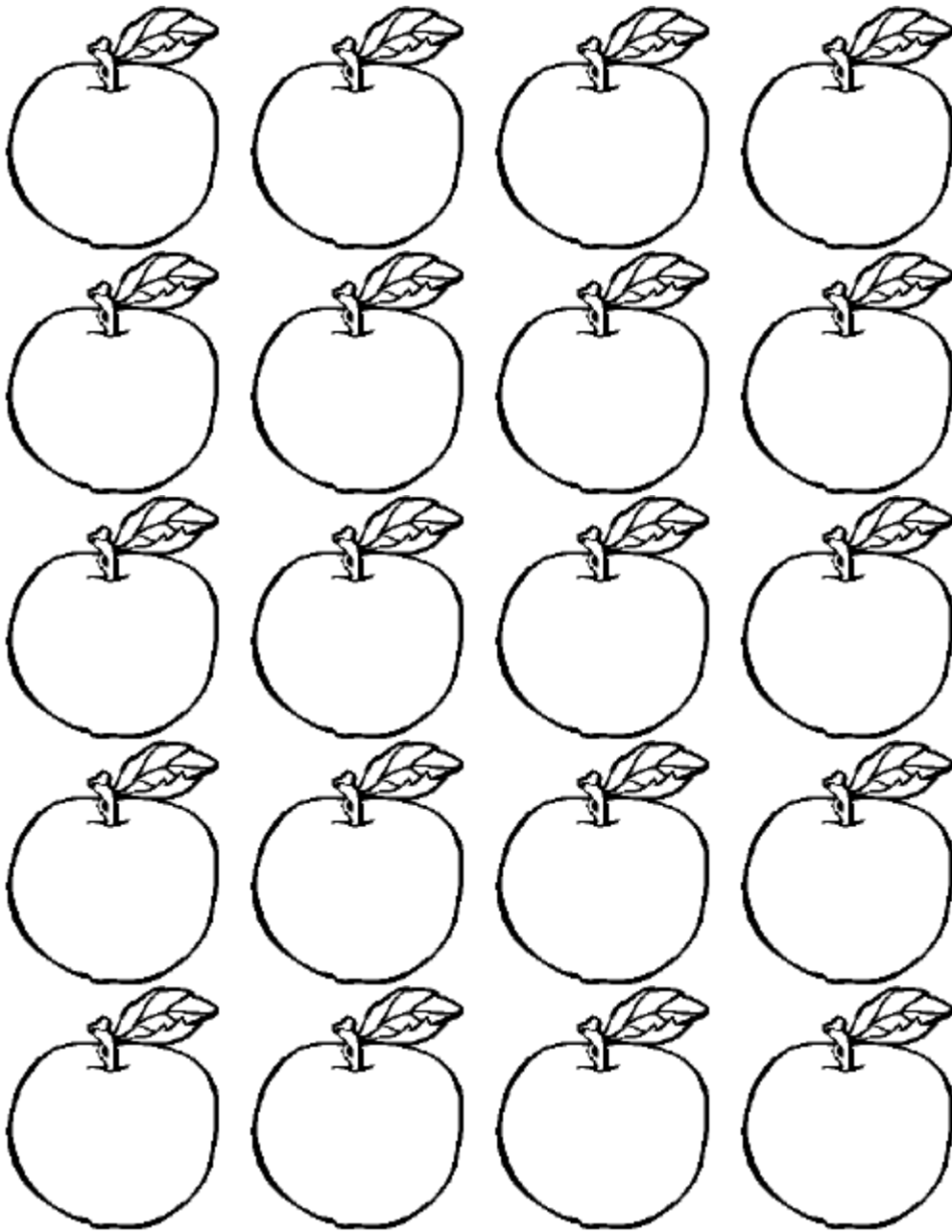
**Summative Assessment:**

The teacher will give a test on word problems on day five. The students will be encouraged to use highlighters, pencils, pens, etc., to complete the problems. There will be ten problems on the test. The students will be asked to complete eight out of the first ten problems and one of the last two problems. See Student Test.

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**Translate each situation into an algebraic equation:**

- 1) Ann has the 5 newest music CD's which is 3 less than twice the amount that Bob has. \_\_\_\_\_
- 2) Mike, who has 6 video games, has half as many games as Paul.  
\_\_\_\_\_
- 3) Nan rode the roller coaster 8 times, which was twice as many times as she rode the Ferris wheel. \_\_\_\_\_
- 4) Janine, who bought \$15 worth of make-up, spent \$6 less than Leah spent. \_\_\_\_\_
- 5) Rob, who has all 13 girls' phone numbers that are in his homeroom, has 3 more than half the number of girls' phone numbers that Jay has.  
\_\_\_\_\_
- 6) Kate's 85 on her English test was 37 points less than twice the grade on her Science test. \_\_\_\_\_
- 7) At the Middle School Graduation Dance, the DJ played 12 slow dances, which was equal to the quotient of the number of fast dances and 2. \_\_\_\_\_
- 8) The 1,840 rock concert tickets sold were twice the amount of jazz concert tickets sold. \_\_\_\_\_
- 9) Meg received 90 votes for Student Council President, which were 50 less than twice the amount that Tom received.  
\_\_\_\_\_
- 10) The 347 students who listed soccer as their favorite sport were 13 less than three times the number of students who listed basketball as their favorite sport. \_\_\_\_\_

**Translate each situation into an algebraic equation:**

- 1) Ann has the 5 newest music CD's which is 3 less than twice the amount that Bob has.  $\underline{2X - 3 = 5}$
- 2) Mike, who has 6 video games, has half as many games as Paul.  
 $\underline{X/2 = 6}$
- 3) Nan rode the roller coaster 8 times, which was twice as many times as she rode the Ferris wheel.  $\underline{2X = 8}$
- 4) Janine, who bought \$15 worth of make-up, spent \$6 less than Leah spent.  $\underline{X - 6 = 15}$
- 5) Rob, who has all 13 girls' phone numbers that are in his homeroom, has 3 more than half the number of girls' phone numbers that Jay has.  
 $\underline{X/2 + 3 = 13}$
- 6) Kate's 85 on her English test was 37 points less than twice the grade on her Science test.  $\underline{2X - 37 = 85}$
- 7) At the Middle School Graduation Dance, the DJ played 12 slow dances, which was equal to the quotient of the number of fast dances and 2.  $\underline{X/2 = 12}$
- 8) The 1,840 rock concert tickets sold were twice the amount of jazz concert tickets sold.  $\underline{2X = 1,840}$
- 9) Meg received 90 votes for Student Council President, which were 50 less than twice the amount that Tom received.  $\underline{2X - 50 = 90}$
- 10) The 347 students who listed soccer as their favorite sport were 13 less than three times the number of students who listed basketball as their favorite sport.  $\underline{3X - 13 = 347}$



The length of a rectangular fish tank is twice its width. A second tank, which is 5 inches longer and 2 inches narrower than the first tank, has a perimeter of 120 inches. Find the length and width of each fish tank.

**A. Use the information in each problem to fill in the chart or to label the diagram. Remember to pick a variable for what you know the least about in the problem.**

1. Sean sold 4 more boxes of candy for the school fundraiser than Marta. The sum of the boxes they sold was 22. How many boxes did each sell?

WHO	NUMBER OF BOXES

2. Ned weighs  $1\frac{1}{2}$  times as much as Jill and Tom weighs 15 kilograms more than Jill. If their combined weight is 190 kilograms, how much does each person weigh?

WHO	WEIGHT

3. Gina has \$72 in \$1 bills, \$5 bills, and \$20 bills. If she has three times as many \$1 bills as she has \$5 bills, and only half as many \$20 bills as \$5 bills, how many of each type of bill does she have?

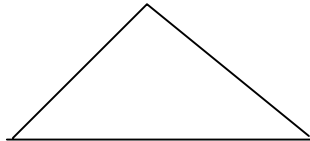
TYPE OF BILL	HOW MANY?	VALUE OF EACH BILL	TOTAL VALUE OF BILL

4. The basketball teams of North Middle School and South Middle School played against each other twice this season. In the first game,

North's score was two-thirds of South's score. In the second game, North's score increased by seven points from the first game while South's score decreased by seven points from the first game. In the second game South's score was three less than North's score, what was the score for each team in both games?

TEAM	FIRST GAME	SECOND GAME

5. The sides of a triangular birdcage are consecutive integers. If the perimeter is 114 centimeters, what is the length of each side?



**B. If you finished and got all of the charts/diagrams correct, see if you can write an equation to help you solve each problem. Then solve the equation and answer the problem.**

**A. Use the information in each problem to fill in the chart or to label the diagram. Remember to pick a variable for what you know the least about in the problem.**

1. Sean sold 4 more boxes of candy for the school fundraiser than Marta. The sum of the boxes they sold was 22. How many boxes did each sell?

WHO	NUMBER OF BOXES
<u>Sean</u>	<u><math>4 + M</math></u>
<u>Marta</u>	<u><math>M</math></u>

Equation:  $4 + M + M = 22$ ,  $2M + 4 = 22$ ,  $2M = 18$ ,  $M = 9$   
Marta sold 9 boxes of candy and Sean sold 13.

2. Ned weighs  $1\frac{1}{2}$  times as much as Jill and Tom weighs 15 kilograms more than Jill. If their combined weight is 190 kilograms, how much does each person weigh?

WHO	WEIGHT
<u>Ned</u>	<u><math>1\frac{1}{2} J</math></u>
<u>Jill</u>	<u><math>J</math></u>
<u>Tom</u>	<u><math>15 + J</math></u>

Equation:  $1\frac{1}{2} J + J + 15 + J = 190$ ,  $3\frac{1}{2} J + 15 = 190$ ,  $3\frac{1}{2} J = 175$ ,  $J = 50$   
Jill weighs 50 kilograms, Tom weighs 65 kg, Ned weighs 75 kg.

3. Gina has \$72 in \$1 bills, \$5 bills, and \$20 bills. If she has three times as many \$1 bills as she has \$5 bills, and only half as many \$20 bills as \$5 bills, how many of each type of bill does she have?

TYPE OF BILL	HOW MANY?	VALUE OF EACH BILL	TOTAL VALUE OF BILL
<u>\$1</u>	<u><math>3F</math></u>	<u><math>1</math></u>	<u><math>3F</math></u>
<u>\$5</u>	<u><math>F</math></u>	<u><math>5</math></u>	<u><math>5F</math></u>
<u>\$20</u>	<u><math>F / 2</math></u>	<u><math>20</math></u>	<u><math>10F</math></u>

Equation:  $3F + 5F + 10F = 72$ ,  $18F = 72$ ,  $F = 4$

There are four five dollar bills, twelve one dollar bills, two twenty dollar bills.

4. The basketball teams of North Middle School and South Middle School played against each other twice this season. In the first game, North's score was two-thirds of South's score. In the second game, North's score increased by seven points from the first game while South's score decreased by seven points from the first game. In the second game South's score was three less than North's score, what was the score for each team in both games?

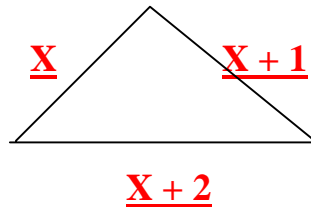
TEAM	FIRST GAME	SECOND GAME
<u>North MS</u>	<u><math>\frac{2}{3} S</math></u>	<u><math>\frac{2}{3} S + 7</math></u>
<u>South MS</u>	<u><math>S</math></u>	<u><math>S - 7</math></u>

Equation:  $S - 7 = \frac{2}{3}S + 7 - 3$ ,  $S - 7 = \frac{2}{3}S + 4$ ,  $\frac{1}{3}S = 11$ ,  $S = 33$

North's Score in the first game = 22, second game = 29

South's Score in the first game = 33, second game = 26

5. The sides of a triangular birdcage are consecutive integers. If the perimeter is 114 centimeters, what is the length of each side?



Equation:  $X + X + 1 + X + 2 = 114$ ,

$3X + 3 = 114$ ,  $3X = 111$ ,  $X = 37$

The lengths of the sides are 37, 38, 39

**B. If you finished and got all of the charts/diagrams correct, see if you can write an equation to help you solve each problem. Then solve the equation and answer the problem.**

Cara is eight years older than Chuck. In five years, Cara will be twice as old as Chuck. How old is each now?

WHO	NOW	IN 5 YEARS



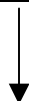
Cara is eight years older than Chuck. In five years, Cara will be twice as old as Chuck. How old is each now?

WHO	NOW	IN 5 YEARS
Cara	$h + 8$	
Chuck	$h$	



\_\_\_\_\_. In five years, Cara will be twice as old as Chuck. How old is each now?

WHO	NOW	IN 5 YEARS
Cara	$h + 8$	$h + 8 + 5$
Chuck	$h$	$h + 5$



\_\_\_\_\_. \_\_\_\_\_ Cara will be twice as old as Chuck. How old is each now?

WHO	NOW	IN 5 YEARS
Cara	$h + 8$	$h + 8 + 5$
Chuck	$h$	$h + 5$

$$h + 8 + 5 = 2(h + 5)$$

1. Cara is eight years older than Chuck. In five years, Cara will be twice as old as Chuck. How old is each now?

WHO	NOW	IN 5 YEARS

2. Bobby is 11, exactly one third as old as his mother. In how many years will he be half as old as she is?

WHO	NOW	IN $y$ YEARS

3. Patty is six years younger than Marci. Seven years ago their ages totaled 26. How old is each now?

WHO	NOW	7 YEARS AGO

4. Dave has 15 coins (all nickels and quarters). He has four times as many nickels as quarters. How many of each coin does he have?

COIN	NUMBER

5. Christina had four times as much money as her brother Kyle, but when their grandmother gave each of them twenty dollars, Christina had twice as much as Kyle. How much did each have originally?

WHO	ORIGINAL	NOW



1. Cara is eight years older than Chuck. In five years, Cara will be twice as old as Chuck. How old is each now?

WHO	NOW	IN 5 YEARS
<u>Cara</u>	<u><math>8 + H</math></u>	<u><math>8 + H + 5</math></u>
<u>Chuck</u>	<u><math>H</math></u>	<u><math>H + 5</math></u>

Equation:  $8 + H + 5 = 2(H + 5)$ ,  $H + 13 = 2H + 10$ ,  $3 = H$   
Chuck is 3 and Cara is 11

2. Bobby is 11, exactly one third as old as his mother. In how many years will he be half as old as she is?

WHO	NOW	IN y YEARS
<u>Bobby</u>	<u>11</u>	<u><math>11 + y</math></u>
<u>Mother</u>	<u>33</u>	<u><math>33 + y</math></u>

Equation:  $(1/2)(33 + y) = 11 + y$ ,  $16.5 + .5y = 11 + y$ ,  $5.5 = .5y$ ,  $y = 11$   
In eleven years, Bobby will be half as old as his mom.

3. Patty is six years younger than Marci. Seven years ago their ages totaled 26. How old is each now?

WHO	NOW	7 YEARS AGO
<u>Patty</u>	<u><math>M - 6</math></u>	<u><math>M - 6 - 7</math></u>
<u>Marci</u>	<u><math>M</math></u>	<u><math>M - 7</math></u>

Equation:  $(M - 6 - 7) + (M - 7) = 26$ ,  $(M - 13) + (M - 7) = 26$ ,  $2M - 20 = 26$ ,  $2M = 46$ ,  $M = 23$ . Patty is 17 and Marci is 23.

4. Dave has 15 coins (all nickels and quarters). He has four times as many nickels as quarters. How many of each coin does he have?

COIN	NUMBER
<u>Nickels</u>	<u>4Q</u>
<u>Quarters</u>	<u>Q</u>

Equation:  $4Q + Q = 15$ ,  $5Q = 15$ ,  $Q = 3$  Dave has 3 Quarters and 12 Nickels.

5. Christina had four times as much money as her brother Kyle, but when their grandmother gave each of them twenty dollars, Christina had twice as much as Kyle. How much did each have originally?

WHO	ORIGINAL	NOW
<u>Christina</u>	<u>4K</u>	<u><math>4K + 20</math></u>
<u>Kyle</u>	<u>K</u>	<u><math>K + 20</math></u>

Equation:  $2(K + 20) = 4K + 20$ ,  $2K + 40 = 4K + 20$ ,  $20 = 2K$ ,  $K = 10$   
 Kyle originally had 10 dollars. Christina originally had 40 dollars.

**Cross out with pencil (or highlight) the information as you use the information in your chart or diagram. Highlight (in a different color) what is left and use this to write your equation. Solve the equation and answer the problem.**

1. The number of nickels that Natalie has is twelve more than the number of dimes that Darryl has. If they both have the same amount of money, how many dimes does Darryl have? (Assume that Natalie has only nickels and Darryl has only dimes.)

WHO	COIN	VALUE OF ONE COIN	NUMBER OF COINS	TOTAL AMOUNT OF MONEY

2. In June, Ryan sold twice as many newspaper subscriptions as George. In July, Ryan sold 5 fewer subscriptions than he did in June, while George sold 3 more subscriptions than he did in June. If they sold the same number of subscriptions in July, how many subscriptions did each sell in June?

WHO	JUNE	JULY

3. Hannah has 2 more than twice as many photo albums as Amy. If Amy buys 10 more albums, she and Hannah will have the same number of albums. How many photo albums does each person have now?

WHO	ORIGINAL NUMBER OF PHOTO ALBUMS	NUMBER OF PHOTO ALBUMS NOW

4. Caitlyn did  $\frac{6}{7}$  of the problems on her math quiz correctly and four incorrectly. She did all the problems. How many were there?

TYPE OF PROBLEM	FRACTIONAL PART OF WHOLE	NUMBER
Correct		
Incorrect		
Total on Quiz	$\frac{7}{7}$	$x$

5. In the summer, Paul earns twice as much each week painting rooms than he does cutting grass. His total weekly wages are \$150 more than that of his younger sister, Megan, who baby-sits. She earns one quarter as much as Paul does painting rooms. How much does Paul earn for painting rooms?

WHO	TYPE OF JOB	WEEKLY WAGES

6. Marleen is three years older than Ned and two years younger than Carla. Ten years ago, Carla's age was equal to the sum of the ages of Ned and Marleen. How old is each now?

WHO	NOW	10 YEARS AGO

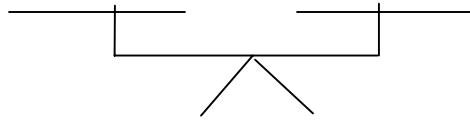
7. Geri spent Friday, Saturday and Sunday selling a total of 24 magazine orders for her school fundraiser. The amounts she sold, respectively, on the three days were consecutive even integers. How many did she sell on each day?

DAY OF WEEK	AMOUNT SOLD

8. Find four consecutive odd integers such that the sum of the first and last is 64.

CONSECUTIVE ODD INTEGER	ALGEBRAIC REPRESENTATION
First	
Second	
Third	
Fourth	

9. Chester put 5 cubes in one pan on a balance. In order to balance this, he needed to add 2 cubes to the 75 gram weight that was already in the other pan. How much does a cube weigh?



10. Becky wants to fence in a rectangular play area for her dog. If she has 82 feet of fencing and wants the length of the play area to be 9 feet longer than its width, what should the dimensions of the play area be?



**Cross out with pencil (or highlight) the information as you use the information in your chart or diagram. Highlight (in a different color) what is left and use this to write your equation. Solve the equation and answer the problem.**

1. The number of nickels that Natalie has is twelve more than the number of dimes that Darryl has. If **they both have the same amount of money**, how many dimes does Darryl have? (Assume that Natalie has only nickels and Darryl has only dimes.)

WHO	COIN	VALUE OF ONE COIN	NUMBER OF COINS	TOTAL AMOUNT OF MONEY
<u>Natalie</u>	<u>nickels</u>	<u>0.05</u>	<u>d + 12</u>	<u>0.05(d + 12)</u>
<u>Darryl</u>	<u>dimes</u>	<u>0.10</u>	<u>d</u>	<u>0.10d</u>

$$\underline{0.05(d + 12) = 0.10d, d = 12}$$

**Darryl has 12 dimes.**

2. In June, Ryan sold twice as many newspaper subscriptions as George. In July, Ryan sold 5 fewer subscriptions than he did in June, while George sold 3 more subscriptions than he did in June. If **they sold the same number of subscriptions in July**, how many subscriptions did each sell in June?

WHO	JUNE	JULY
<u>Ryan</u>	<u>2g</u>	<u>2g - 5</u>
<u>George</u>	<u>g</u>	<u>g + 3</u>

$$\underline{2g - 5 = g + 3, g = 8}$$

**George sold 8 subscriptions and Ryan sold 16 .**



3. Hannah has 2 more than twice as many photo albums as Amy. If Amy buys 10 more albums, she and Hannah will have the same number of albums. How many photo albums does each person have now?

WHO	ORIGINAL NUMBER OF PHOTO ALBUMS	NUMBER OF PHOTO ALBUMS NOW
<u>Hannah</u>	<u><math>2a + 2</math></u>	<u><math>2a + 2</math></u>
<u>Amy</u>	<u><math>a</math></u>	<u><math>a + 10</math></u>

$$\underline{2a + 2 = a + 10, a = 8}$$

They each have 18 photo albums.

4. Caitlyn did  $\frac{6}{7}$  of the problems on her math quiz correctly and four incorrectly. She did all the problems. How many were there?

TYPE OF PROBLEM	FRACTIONAL PART OF WHOLE	NUMBER
Correct	<u><math>\frac{6}{7}</math></u>	<u><math>x - 4</math></u>
Incorrect	<u><math>\frac{1}{7}</math></u>	<u><math>4</math></u>
Total on Quiz	$\frac{7}{7}$	$x$

$$\underline{\frac{1}{7}x = 4, x = 28}$$

There were 28 problems on the quiz.

5. In the summer, Paul earns twice as much each week painting rooms than he does cutting grass. His total weekly wages are \$150 more than that of his younger sister, Megan, who baby-sits. She earns one quarter as much as Paul does painting rooms. How much does Paul earn for painting rooms?

WHO	TYPE OF JOB	WEEKLY WAGES
<u>Paul</u>	<u>Painting rooms</u>	$2g$
<u>Paul</u>	<u>Cutting grass</u>	$g$
<u>Megan</u>	<u>Babysitting</u>	$(1/4)2g$

$$2g + g = 150 + (1/4)2g, g = 60$$

Paul earns \$120 for painting rooms.

6. Marleen is three years older than Ned and two years younger than Carla. Ten years ago, Carla's age was equal to the sum of the ages of Ned and Marleen. How old is each now?

WHO	NOW	10 YEARS AGO
<u>Marleen</u>	$m$	$m - 10$
<u>Ned</u>	$m - 3$	$m - 3 - 10$
<u>Carla</u>	$m + 2$	$m + 2 - 10$

$$(m + 2 - 10) = (m - 10) + (m - 3 - 10), m = 15$$

Marleen is 15, Ned is 12, and Carla is 17.

7. Geri spent Friday, Saturday and Sunday selling a total of 24 magazine orders for her school fundraiser. The amounts she sold, respectively, on the three days were consecutive even integers. How many did she sell on each day?

DAY OF WEEK	AMOUNT SOLD
<u>Friday</u>	<u><math>n</math></u>
<u>Saturday</u>	<u><math>n + 2</math></u>
<u>Sunday</u>	<u><math>n + 4</math></u>

$$n + n + 2 + n + 4 = 24, n = 6$$

Geri sold 6 orders on Friday, 8 orders on Saturday, and 10 orders on Sunday.

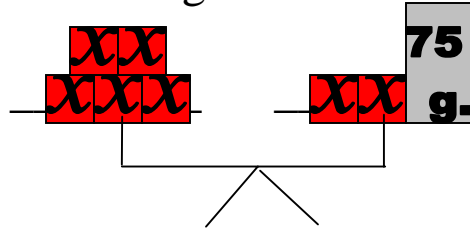
8. Find four consecutive odd integers such that the sum of the first and last is 64.

CONSECUTIVE ODD INTEGER	ALGEBRAIC REPRESENTATION
First	<u><math>n</math></u>
Second	<u><math>n + 2</math></u>
Third	<u><math>n + 4</math></u>
Fourth	<u><math>n + 6</math></u>

$$n + n + 6 = 64, n = 29$$

The integers are 29, 31, 33, and 35.

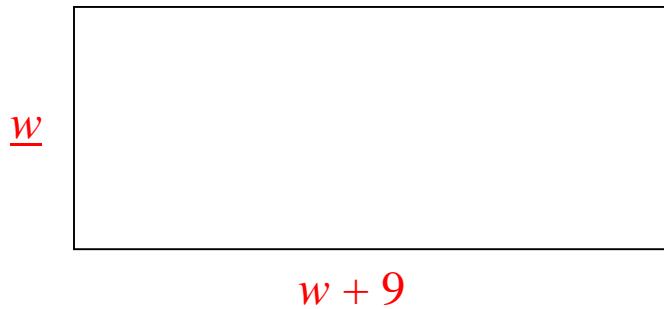
9. Chester put 5 cubes in one pan on a balance. In order to balance this, he needed to add 2 cubes to the 75-gram weight that was already in the other pan. How much does a cube weigh?



$$5x = 2x + 75, x = 25$$

Each cube weighs 25 grams.

10. Becky wants to fence in a rectangular play area for her dog. If she has 82 feet of fencing and wants the length of the play area to be 9 feet longer than its width, what should the dimensions of the play area be?



$$\text{Perimeter} = 82.$$

$$2(w + 9) + 2w = 82, w = 16$$

The dimensions are 16 ft. by 25 ft.

Name\_\_\_\_\_

Date\_\_\_\_\_

## Test on Word Problems

COMPLETE ANY 8 OF THE FIRST 10 PROBLEMS. YOU ALSO NEED TO COMPLETE EITHER 11 OR 12. YOU MAY DO MORE FOR EXTRA CREDIT. BE SURE YOU:

1) Fill in the Chart. 2) Write an equation. 3) Show work to solve equation. 4) Answer the problem.

1. Find four consecutive integers whose sum is 682.

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Consecutive Integer	Algebraic Representation
First	
Second	
Third	
Fourth	

2. I have twice as many nickels as quarters. If the coins are worth \$4.90, how many quarters and nickels do I have?

\_\_\_\_\_quarters \_\_\_\_\_nickels

Coin	Number	Value	Total worth

3. Jack bought a pizza and a drink for \$2.65. If the pizza costs a penny more than 3 times the cost of the drink, how much did each cost?

Drink: \_\_\_\_\_ Pizza: \_\_\_\_\_

Type of Food	Cost

4. Find a number that is 15 more than 4 times its opposite.

Number: \_\_\_\_\_

Number	
Opposite	

5. Joe weighs 20 lbs. less than twice Jeff's weight. If Jeff would gain 10 lbs., then together they would weigh 250 lbs. How much does each weigh?

Joe: \_\_\_\_\_ Jeff: \_\_\_\_\_

Who	Now	Later

6. Karen is seven years older than Suzanne. Four years ago, Karen was twice as old as Suzanne was. How old are they now? Karen: \_\_\_\_\_ Suzanne: \_\_\_\_\_

Who	Now	4 years ago

7. The sum of the least and greatest of three consecutive integers is 72. What are the three integers? \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Consecutive Integers	Algebraic Representation
First	
Second	
Third	

8. The Maryland Monkeys won six less than twice as many soccer games as The Pennsylvania Pigs. If the teams won a total of 48 games, how many games did each win?  
The Maryland Monkeys: \_\_\_\_\_ The Pennsylvania Pigs: \_\_\_\_\_

Team	# of Games
Maryland Monkeys	
Pennsylvania Pigs	

9. The sum of two consecutive odd integers is negative 28. Find the integers. \_\_\_\_\_, \_\_\_\_\_

Consecutive Odd Integers	Algebraic Representation
First	
Second	

10. The measure of one angle of a triangle is 55 degrees. The measure of the third angle is 20 degrees more than twice the second angle. All three angles of a triangle must add to 180 degrees. Find the measures of the second and third angles.

Second angle: \_\_\_\_\_

Third angle: \_\_\_\_\_

Angle	Measure of Angle
First	
Second	
Third	

11. Given the following equation, create a word problem. Explain why and how you created the problem. (What were you thinking as you created the problem?) Justify why your problem represents the equation.

$$2x + 5 = 23$$

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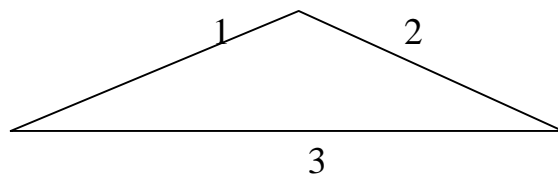
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12. Workers are setting up the stage for the Nelly and Fifty Cent Concert. The stage is in the shape of a triangle. The sides of the triangle are consecutive even numbers. If the perimeter of the stage is 168, what is the length of each side?



Equation:

side 1=\_\_\_\_\_ side 2=\_\_\_\_\_ side 3=\_\_\_\_\_

- Explain how you solved this problem in words. (What were you thinking as you solved this problem?) Justify why your answer is correct.

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- How would you use the information that you learned to solve this problem in real-life?  
What professions might need the skills that you used to solve any of the problems on this test?

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Name\_\_\_\_\_

Date\_\_\_\_\_

## Test on Word Problems

COMPLETE ANY 8 OF THE FIRST 10 PROBLEMS. YOU ALSO NEED TO COMPLETE EITHER 11 OR 12. YOU MAY DO MORE FOR EXTRA CREDIT. BE SURE YOU:

1) Fill in the Chart. 2) Write an equation. 3) Show work to solve equation. 4) Answer the problem.

1. Find four consecutive integers whose sum is 682. 169, 170, 171, 172

Equation:  $4n + 6 = 682$ ,  $n = 169$

Consecutive Integer	Algebraic Representation
First	<u><math>n</math></u>
Second	<u><math>n + 1</math></u>
Third	<u><math>n + 2</math></u>
Fourth	<u><math>n + 3</math></u>

2. I have twice as many nickels as quarters. If the coins are worth \$4.90, how many quarters and nickels do I have? 14 quarters 28 nickels

Equation:  $35Q = 490$ ,  $Q = 14$

Coin	Number	Value	Total worth
<u>Quarters</u>	<u><math>Q</math></u>	<u><math>25</math></u>	<u><math>25Q</math></u>
<u>Nickels</u>	<u><math>2Q</math></u>	<u><math>5</math></u>	<u><math>10Q</math></u>

3. Jack bought a pizza and a drink for \$2.65. If the pizza costs a penny more than 3 times the cost of the drink, how much did each cost? Drink: 66cents Pizza: \$1.99

Equation:  $4d + 1 = 265$ ,  $d = 66$

Type of Food	Cost
<u>Pizza</u>	<u><math>3d + 1</math></u>
<u>Drink</u>	<u><math>d</math></u>

4. Find a number that is 15 more than 4 times its opposite.

Number: 3

Equation:  $n = 15 + 4(-n)$ ,  $n = 3$

Number	<u><math>n</math></u>
Opposite	<u><math>-n</math></u>

5. Joe weighs 30 lbs. less than twice Jeff's weight. If Jeff would gain 10 lbs., then together they would weigh 250 lbs. How much does each weigh?

Joe: 150 lbs. Jeff: 90 lbs.

Equation:  $3a - 20 = 250, a = 90$

Who	Now	Later
<u>Joe</u>	<u><math>2a - 30</math></u>	<u><math>2a - 30</math></u>
<u>Jeff</u>	<u><math>a</math></u>	<u><math>a + 10</math></u>

6. Karen is seven years older than Suzanne. Four years ago, Karen was twice as old as Suzanne was. How old are they now? Karen: 18 year old Suzanne: 11 year old

Equation:  $s + 3 = 2(s - 4), s = 11$

Who	Now	4 years ago
<u>Karen</u>	<u><math>S + 7</math></u>	<u><math>S + 7 - 4</math></u>
<u>Suzanne</u>	<u><math>S</math></u>	<u><math>S - 4</math></u>

7. The sum of the least and greatest of three consecutive integers is 72. What are the three integers?

35, 36, 37

Equation:  $n + n + 2 = 72, n = 35$

Consecutive Integers	Algebraic Representation
First	<u><math>n</math></u>
Second	<u><math>n + 1</math></u>
Third	<u><math>n + 2</math></u>

8. The Maryland Monkeys won six less than twice as many soccer games as The Pennsylvania Pigs. If the teams won a total of 48 games, how many games did each win?

The Maryland Monkeys: 30 games The Pennsylvania Pigs: 18 games

Equation:  $3g - 6 = 48, g = 18$

Team	# of Games
Maryland Monkeys	<u><math>2g - 6</math></u>
Pennsylvania Pigs	<u><math>g</math></u>

9. The sum of two consecutive odd integers is negative 28. Find the integers. -15, -13

Equation:  $2n + 2 = -28$ ,  $n = -15$

Consecutive Odd Integers	Algebraic Representation
First	<u><math>n</math></u>
Second	<u><math>n + 2</math></u>

10. The measure of one angle of a triangle is 55 degrees. The measure of the third angle is 20 degrees more than twice the second angle. All three angles of a triangle must add to 180 degrees. Find the measures of the second and third angles.

Second angle: 35 degrees Third angle: 90 degrees

Equation:  $55 + x + 2x + 20 = 180$ ,  $x = 35$

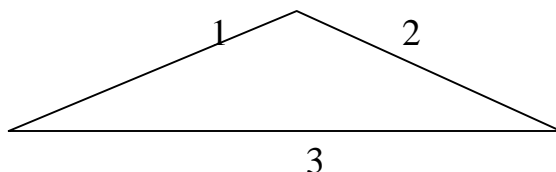
Angle	Measure of Angle
First	<u>55 degrees</u>
Second	<u><math>x</math></u>
Third	<u><math>2x + 20</math></u>

11. Given the following equation, create a word problem. Explain why and how you created the problem. (What were you thinking as you created the problem?) Justify why your problem represents the equation.

$2x + 5 + x = 23$

Answers may vary depending on student. Angela's shoe size is five more than twice Meghan's shoe size. The total of the two sizes is 23. What is each girl's shoe size? I created the problem using the models that I had solved previously. I thought about the operations that were involved in the equation and wrote sentences that represented the symbols. For example, multiplication was involved so I used the word 'times'.

12. Workers are setting up the stage for the Nelly and Fifty-Cent Concert. The stage is in the shape of a triangle. The sides of the triangle are consecutive even numbers. If the perimeter of the stage is 168, what is the length of each side?



Equation:  $X + X + 2 + X + 4 = 168$

side 1 = 54 side 2 = 56 side 3 = 58

- Explain how you solved this problem in words. (What were you thinking as you solved this problem?) Justify why your answer is correct.

I set up an equation by first labeling the missing components based on one missing part. I combined like terms and solved the equation. I found x, which represented one missing side. Then I put the x value back into the expressions for the other sides of the triangle and found those measures.

- How would you use the information that you learned to solve this problem in real-life? What professions might need the skills that you used to solve any of the problems on this test?

If you needed to build something that involved a roof. Carpenters have to complete triangles on a regular basis. Any problems in life can be solved by using the procedure that we have discussed over the past couple of days. Organizing information by omitting and highlighting information could be used for any type of problem.